Performance Analysis in Strength Training: An Innovative Instrumentation

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ABSTRACT

In strength training, the performance of the athletes varies according to different objectives of the training. In this study, the performance of the athlete in strength training is defined as the torque and power generated to lift given loads. Electromyography (EMG) is utilized during the performance assessment to prevent muscle injuries. Over the past few years, athletic and clinical testing on performance analysis and enhancement have traditionally taken place in the laboratory due to the low portability of the equipment. With the rapid development in electronics miniaturization, instrumentation for such data acquisition can be constructed in mini and micro scale. Miniaturized instrumentations are designed to be unobtrusive to athletes' movement during performance analysis and enhancement. On the other hand, the correlation between muscle activity and real-time data for performance assessment is critical for coaches and physiologists. With the aid of a miniaturized system that can correlate the muscle activity with performance, fatigue, impulse and total energy expenditure, coaches and physiologists can plan the most suitable training for athletes to achieve higher performance. In conclusion, this study focuses on the miniaturized instrumentation for the analysis of athletes' performance in strength training.

KEYWORDS: Strength Training; Performance Analysis; Instrumentation; EMG; Muscle Fatigue

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